

**Work Order ID 59171**

Thursday, May 27, 2010 12:36:03 PM

Page 1

Item ID: D350-748-201

Accept

Revision ID:

Item Name: Crosstube Installation, High Aft

Start Date: 5/27/2010 Start Qty: 1.00

Required Date: 6/11/2010 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan: PLDate: 10-5-27 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D350-748-241

Rev E

100

0.00

DC

0.00

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile &amp; type labels per PPPD350-748-201 CHG001

110

0.00

CNC Bend 2

BENDING MACHINE - CROSSTUBES

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

120

0.00

QC

Memo

0.00

Quality Control

QC15- Crosstube Dimensional Check

(1X) MB 10-06-08

P10.06.09 / S060609

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

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Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,  
Set-up drill table as per QSI 010

2-Debur

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPS3 on the interior of tube

Batch: 109756

N/A 10-06-09

AUM 10-06-09

140



QC

Quality Control

QC6- Inspect dimensions to drawing

0.00

Memo

0.00

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Paint Outside of Tube as per Dart QSI 005 4.2								
190 	QC14- Inspect Spray Paint	0.00							
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200 	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-241 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN- LBS								

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start  
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00				_____	_____	_____	_____
220  Packaging Packaging	Pick Kit  Memo	0.00  0.00				_____	_____	_____	_____
230  QC Quality Control	QC4- 100% Inspect kits for completeness  Memo	0.00  0.00				_____	_____	_____	_____

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Stop



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Required Date: 6/11/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

240



Packaging

0.00

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD350-748-201

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

250



QC21- Final Inspection - Work Order Release

0.00

QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
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Work Order ID: 59171



Parent Item: D350-748-201



Parent Item Name: Crosstube Installation, High Aft

Start Date: 5/27/2010

Required Date: 6/11/2010

Comments:

IPP Rev: A New Issue 06-07-05 JLM

IPP Rev: B Update qty of MS21042L5 06-09-12 KJ

IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

D350-748-241TRN

Manufactured No

110 Each

1.0000

1

1



Crosstube Turning Detail



B-55372 MB 10-06-08

Location

Loc Qty

Loc Code

LG

1

47170

1

ALS4-1032-225

Purchased

No

200

Each

7,062.000

1

1



Insert

Location

Loc Qty

Loc Code

PK011

7062

110768

7062

AN960JD10

NAS1149D0363J Purchased

No

200

Each

0.0000

1

1



Washer

D2856-400

Manufactured

No

200

f

269.1088

1.181

1.243158



Abraison Strip

Location

Loc Qty

Loc Code

ST403

269.1088

50593

62.0568

56626

207.052

1- cut as per dwg D2856

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IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

D3502-1 Manufactured No 200 Each 67.0000 2 2



Support

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST066	67	
47120	1	
50287	38	
52903	28	

MS21920-20 Purchased No 200 Each 111.0000 2 2



Clamp (per MIL-DTL-8783C)

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	111	
112307	2	
112624	32	
112793	3	
114687	50	
114779	24	

MS27039-1-10 Purchased No 200 Each 150.0000 1 1



Screw

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST291	150	
112794	50	
112940	100	

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Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

AN4-41A Purchased No 220 Each 134.0000 8 8



Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST360	134	
110731	2	
111424	26	
112082	6	
113359	100	

AN4-6A Purchased No 220 Each 926.0000 16 16



Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST356	926	
112933	96	
113149	600	
114523	30	
114615	200	

AN5-32A Purchased No 220 Each 186.0000 4 4



Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST340	186	
113121	36	
114056	100	
114405	50	

AN960JD416 NAS1149D0463J Purchased No 220 Each 0.0000 32 32



Washer

Thursday, May 27, 2010 12:36:07 PM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

AN960JD516 NAS1149D0563J Purchased No 220 Each 0.0000 8 8



Washer

D3500-1 Manufactured No 220 Each 36.0000 4 4



Saddle

Location

Loc Qty

Loc Code

ST425

36

47119

1

52326

9

55605

26

D3501-1 Manufactured No 220 Each 479.0000 16 16



Bushing

Location

Loc Qty

Loc Code

ST066

479

45402

16

45918

159

48268

204

53779

100

W/O:		WORK ORDER CHANGES					
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IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

MS21042L4 Purchased No 220 Each 2,605.000 24 24



Nut

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST139	2	
111827	2	
ST300	2603	
113422	80	
114523	1515	
114718	1000	
9063	8	

MS21042L5 Purchased No 220 Each 515.0000 4 4



Nut

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST300	515	
113523	12	
113537	3	
114437	100	
114449	400	

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

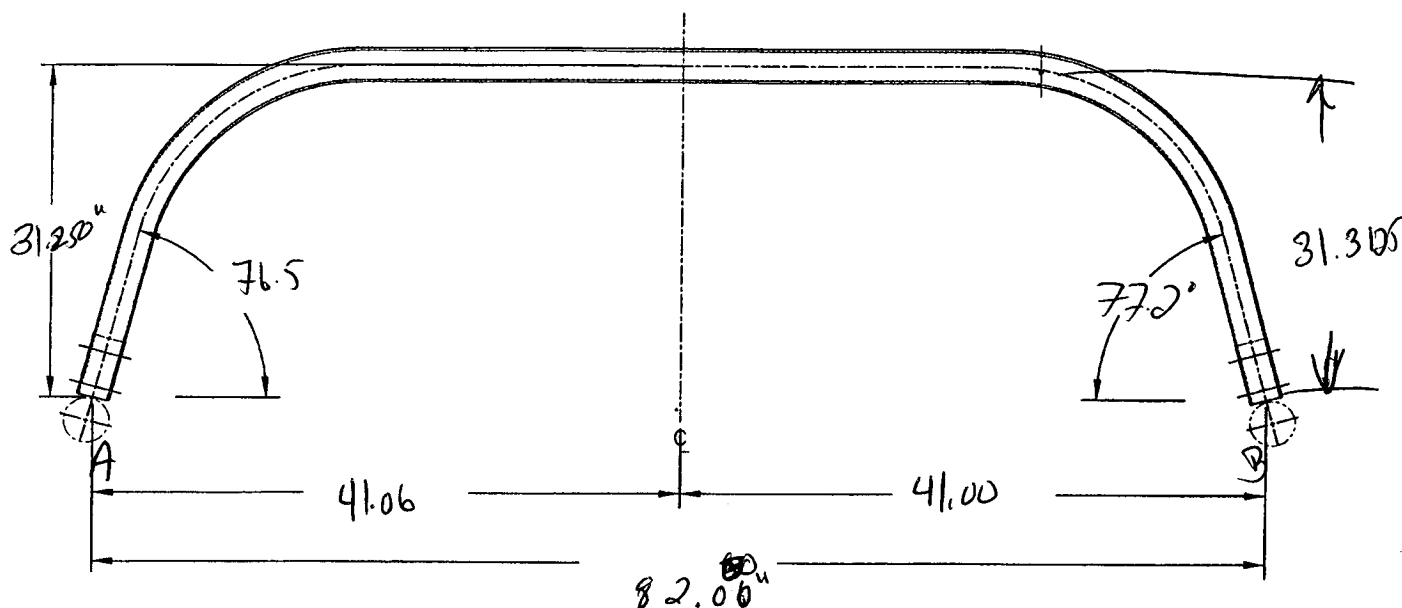
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DART AEROSPACE LTD		Work Order:	39171
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241	Rev: 07.02.06	Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
twist = 0.284"
OK of 10.06.09

QC15 Inspection	8
Date	10/06/09

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	[Signature]

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Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6018-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

# GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6018-125  
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2  
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT

WITHOUT NOTICE  
WORK ORDER

NO. 59171

2810-5-71

**RELEASED**  
2009-10-29

E	REVISE GENERAL NOTES: UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>Q</u>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	<u>Q</u>	DRAWING NO.	REV. E
MFG. APPR.	<u>Q</u>	D350-748-241	SHEET 1 OF 4
APPROVED	<u>Q</u>	TITLE	SCALE
DE APPR.	<u>Q</u>	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

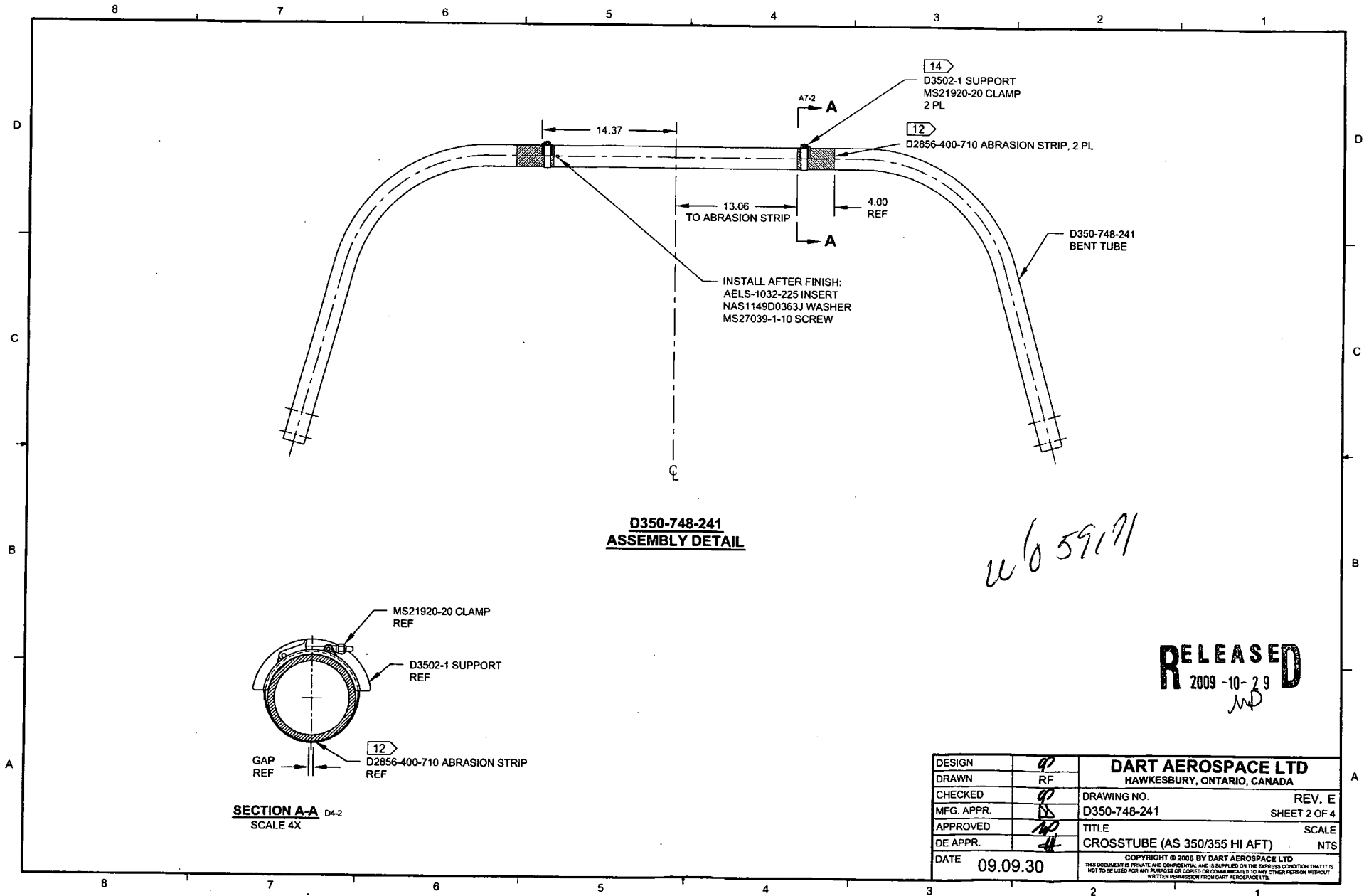
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



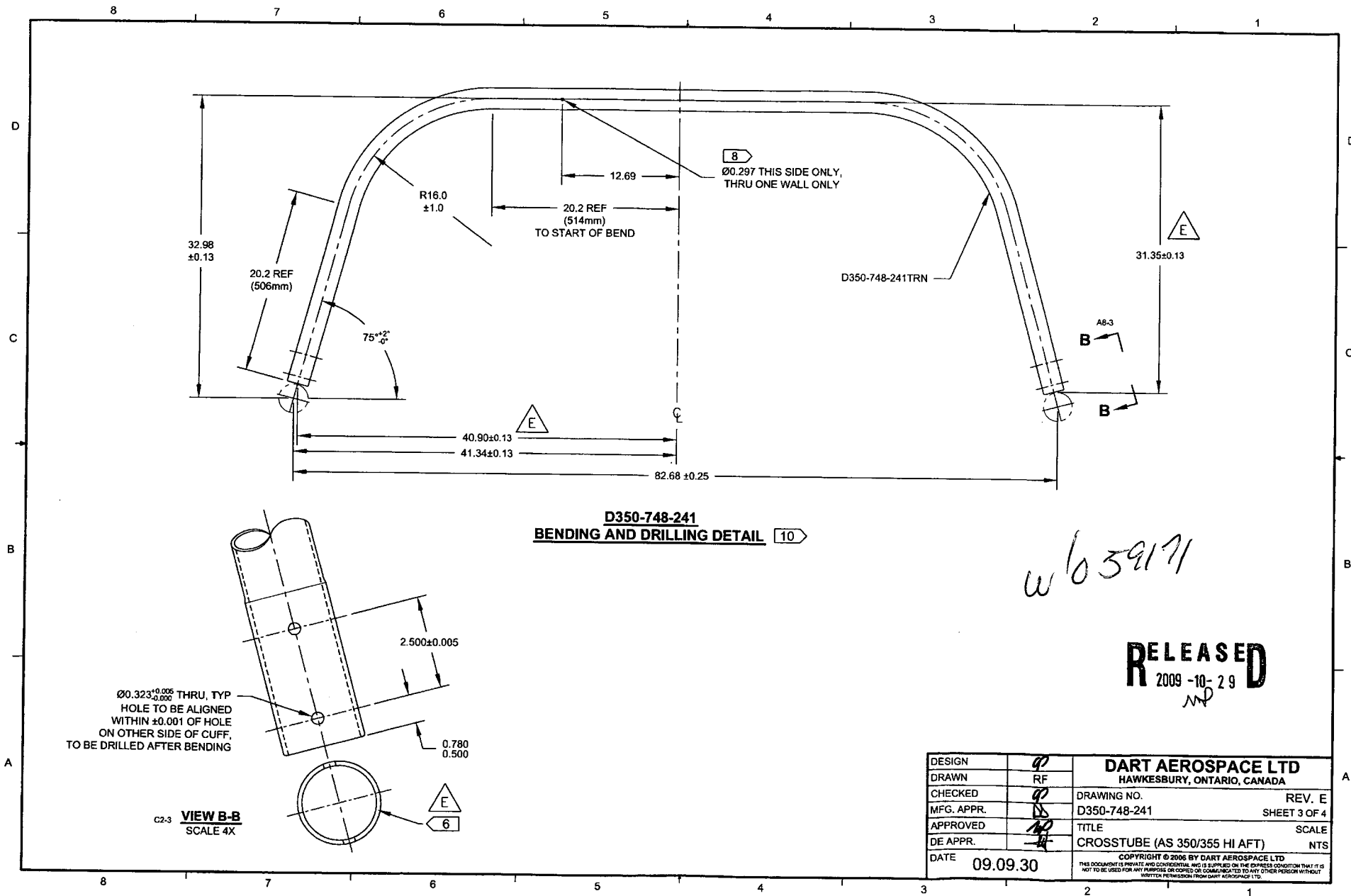
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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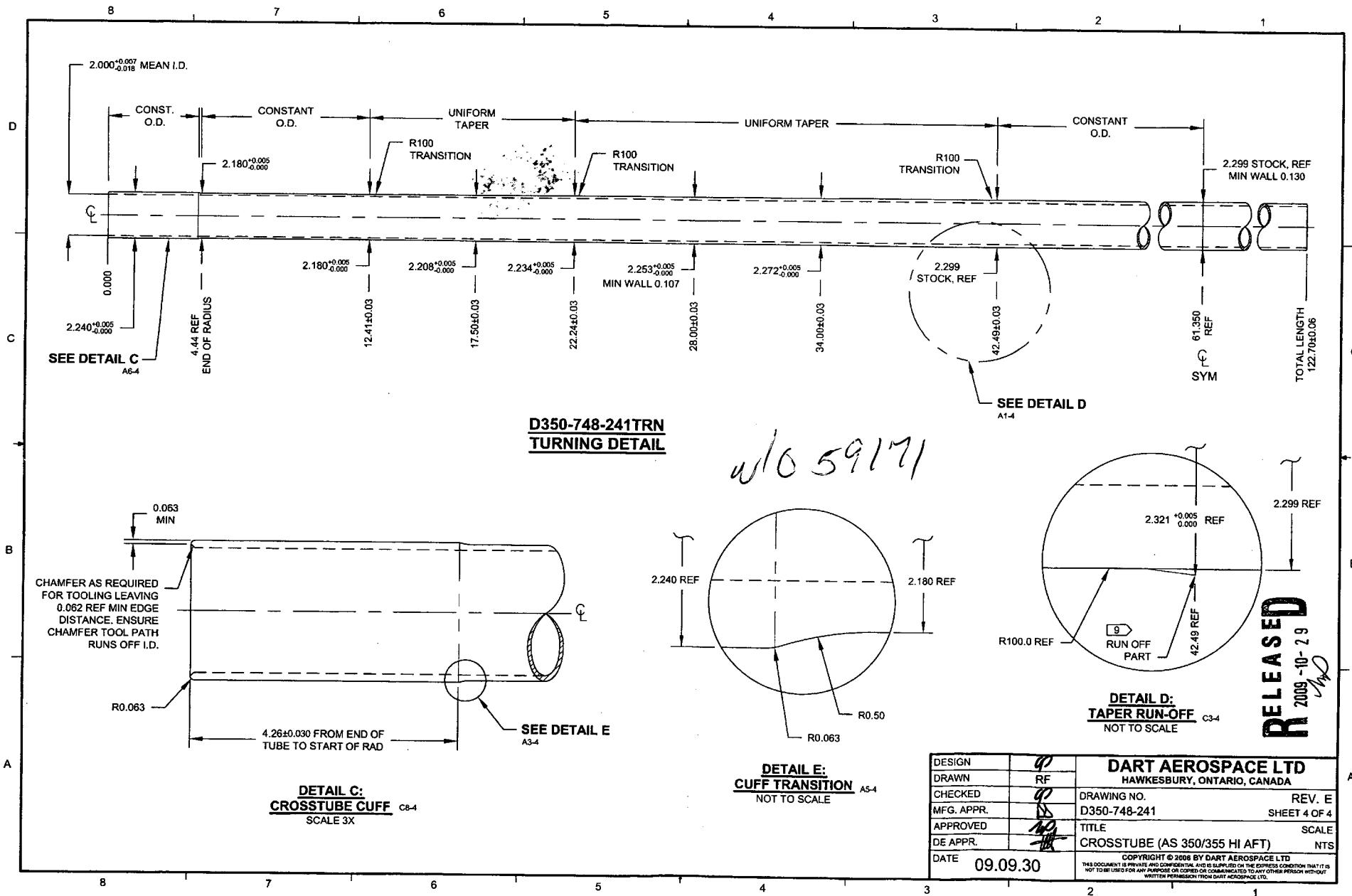
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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 Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries